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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/715,701	11/16/2000	Andrew Wolfe	2926	8544

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EXAMINER
SAJOUS, WESNER

ART UNIT	PAPER NUMBER
2676	10

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/715,701	WOLFE, ANDREW	
	Examiner	Art Unit	
	Wesner Sajous	2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,7-9 and 11-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-27* is/are allowed.

6)☒ Claim(s) *1,8-14 and 28* is/are rejected.

7)☒ Claim(s) *4,7,15-17 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Remark

1. This Office Action is in response to the amendment filed on June 24, 2003. By this amendment, 2-3, 5-6, 1 and are canceled, and claims 28-29 are added. As a result, claims 1, 4, 7-9, and 11-29 are currently presented for examination.

Response to Amendments/Arguments

Regarding the objections to the claims, drawings and specification, it is noted that these objections are obviated by the amendments filed on 6/24/2003. Accordingly, they are removed from consideration.

With regard to the Applicant's argument, at page 11, paragraphs 2-3 of the response, contending that the Dye reference does not disclose having distinctive bounding boxes for source and destination operands and utilizing these specific bounding boxes to determine dependency, nor does Dye discuss comparison of any "destination" bounding boxes, the Examiner disagrees. For such a disclosure is at least obvious over the Dye reference. Dye discloses comparing two objects or bounding boxes to determine if collision (or dependencies) occurs. See col. 66, lines 32-66. Thus, by this embodiment, it is noted that since two bounding boxes are being compared, they are distinct from each other because they occupy different workspace or X, Y, Z space on the screen display. The destination bounding box is contemplated to be any of the boxes that will be compared with a first bounding box while the first box is being executed on the screen or window workspace area. It is to be noted that each

window workspace area on the screen is deciphered to be represented in X, Y, Z coordinate space. And, Dye suggests that each object or bounding box is represented in X, Y, Z space (see col. 66, lines 32-50). Therefore, a bounding box is [inherently] surrounding each window workspace area on the screen where triangles representing the each object or bounding box will be rendered. For it is not convinced that the two boxes are concurrently dispatched from the registers to the screen workspace for processing. Dye suggests that the objects are assembled on a per object basis using X and Y bounds (see col. 67, lines 30-34). Hence, the screen workspace area for the second bounding box is characterized as the destination operand for any of the bounding boxes. Thus, the Applicant's argument is not deemed persuasive.

Regarding the Applicant's argument, at page 12, paragraph 2 of the response, contending that the Dye reference does not discuss comparison of a set of destination pixel locations, the Examiner, similarly to the arguments of claim 1, disagrees. A bounding box can surround the window workspace area, which represents an object, because it is represented in the screen in X, Y, Z coordinate space. And, a destination bounding box is contemplated to be any of the boxes that will be compared with a first bounding box while the first box is being executed on the screen or window workspace area. Thus, since Dye compares the X, Y, Z space of a first object or window with the X, Y, Z space of a second object or window for collision (see col. 66, lines 43-46), pixels locations or destination operands where the primitive will draw its graphics can also be compared. In addition, since a window is characterized as a workspace area on the screen, it can also be characterized as the locations of pixels the object or bounding box

will occupy during execution of the bounding boxes to determine overlap or unions or collisions between the objects on the workspace. Therefor, the Applicant's arguments are not deemed persuasive.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 8-13, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dye, US Pat. No. 6108014.

Considering claim 1, Dye, at fig. 32, discloses a method for determining dependencies (*e.g., collisions or unions*) between a first graphics primitive (i.*e., a first object*) and a second graphics primitive (*e.g., a second object*), see col. 66, lines 35-37, and lines 43-60)), the method comprises calculating a first bounding box for the first graphics primitive (*e.g., determining bounding box of each object,* see *fig. 32, item 800, see col. 67, lines 6-8, see also col. 66, lines 35-36 & 43-45*); calculating a second bounding box for the second graphics primitive (*see fig. 32, item 800, see col. 67, lines 6-8, see also col. 66, lines 35-36 & 43-45*); and determining (e.g., at step 802 of fig. 32) whether the first bounding box and the second bounding box overlap (*e.g., intersect*), wherein a dependency (*e.g., a collision or union*) is detected if the [bounding] boxes

overlap (*or intersect), see col. 66, lines 43-50, and col. 67, lines 8-23. See also fig. 29 as the characteristic for when the two boxes overlap)).*

It is noted that Dye lacks implicit recitation for the first bounding box surrounds a source operand of the first graphics primitive, and the second bounding box surrounds a destination operand of the second graphics primitive.

However, such a disclosure is at least obvious over the Dye reference. Dye discloses comparing two objects or bounding boxes to determine if collision (or dependencies) occurs. See col. 66, lines 32-66. Thus, by this embodiment, it is noted that since two bounding boxes are being compared, they are distinct from each other because they occupy different workspace or X, Y, Z space on the screen display. The destination bounding box is contemplated to be any of the boxes that will be compared with a first bounding box while the first box is being executed on the screen or window workspace area. It is to be noted that each window workspace area on the screen is deciphered to be represented in X, Y, Z coordinate space. And, Dye suggests that each object or bounding box is represented in X, Y, Z space (see col. 66, lines 32-50). Hence, a bounding box is [intrinsically] surrounding each window workspace area on the screen where triangles representing the each object or bounding box will be rendered. For it is not convinced that the two boxes are concurrently dispatched from the registers to the screen workspace for processing, because Dye suggests that the objects are assembled on a per object basis using X and Y bounds (see col. 67, lines 30-34). Hence, the screen workspace area for the second bounding box is characterized as the destination operand for any of the bounding boxes.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dye to include that the first bounding box surrounds a source operand of the first graphics primitive, and the second bounding box surrounds a destination operand of the second graphics primitive, in order to reduce the amount of Z-buffer memory bandwidth required for 3D animation. See col. 66, lines 54-56.

In claim 5, the claimed "first bounding box surrounds a destination operand of the first graphics primitive" is inherent in the disclosure of Dye because it is suggested that each object will be rendered in a workspace area. See *col. 67, lines 50-56.*

As per claim 6, the claimed "second bounding box surrounds a destination operand of the second graphics primitive" is inherent in the disclosure of Dye because it is suggested that each object will be rendered in a workspace area. See *col. 67, lines 50-56.*

Regarding claim 8, Dye, at fig. 32, discloses a method for determining whether a dependency (*e.g., intersection or union of the bounding boxes*) exists between a first graphics primitive (i.*e., a first object*) and a second graphics primitive (*e.g., a second object*), as a function of comparing the [two objects and/or bounding boxes]. See fig. 8, items 800, and 802, and col. 66, lines 43-60.

Dye fails to specifically teach comparing destination locations of pixels of each (first and second graphic) primitive.

However, since Dye clearly discloses the rendering of polygons or triangle objects with X, Y coordinate locations as applied in the field of computer graphics

display (see col. 67, lines 42-55), and compare X, Y, Z space locations of each box to enable each X, Y pixel in the union (or dependency detection) of the bounding boxes (see col. 67, lines 1-34), it would have been obvious that the X, Y, Z space including the X, Y coordinates can be considered as the locations of the pixels. Thus, the invention of Dye uses and compares pixels locations during the detection of union or dependency, because in computer graphics, pixel locations need to be determined in order to draw primitives (e.g., windows, or objects, or triangles, or polygons, or rectangles) and their coordinates.

In addition, the window workspace area, which represents an object (as suggested in col. 67, lines 35-67), can be surrounded by a bounding box, because it is represented in the screen in X, Y, Z coordinate space. And, a destination bounding box is contemplated to be any of the boxes that will be compared with a first bounding box while the first box is being executed on the screen or window workspace area. Thus, since Dye compares the X, Y, Z space of a first object or window with the X, Y, Z space of a second object or window for collision (see col. 66, lines 43-46), pixels locations or destination operands where the primitive will draw its graphics can also be compared. In addition, since a window is characterized as a workspace area on the screen, it can also be characterized as the locations of pixels the object or bounding box will occupy during execution of the bounding boxes to determine overlap or unions or collisions between the objects on the workspace.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the invention of Dye to include the comparison of

locations of pixels of a first and a second graphics primitives to determine if dependency exist between them. Such modification would allow the system of Dye to store video data in different bit per pixel formats for display on a video monitor. See Dye col. 2, lines 61-63.

As per 9, claim Dye, at fig. 32, discloses the step of comparing comprising calculating a first bounding box which surrounds the set of destination pixel locations (or workspace) of the first graphics primitive (*as met by step 800*); calculating a second bounding box which surrounds the destination pixel locations (or space) of the second graphics primitive (*as met by step 800*), *see col. 67, lines 6-8, see also col. 66, lines 43-45*); and comparing the first bounding box with the second bounding box (*as met by step 802 of fig. 32, see col. 67, lines 8-13).*

In claim 10, Dye discloses a dependency exists (*e.g., intersection or union of the bounding boxes*) between the first and second graphics primitives if the [bounding] boxes overlap (*or intersect), see col. 67, lines 8-23)).*

The invention of claim 11 substantially recites the underlying steps performed by the method of claim 8. As the various elements of claim 8 have been shown to be obvious over the teachings of Dye, it is readily apparent the method disclosed by the applied prior art performs the recited underlying functions. As such the limitations recited in claim 11 are rejected for the same reason and rationale given above for claim 8. The Applicant should duly note that the source operand characterizes the Z memory or Z values of X, Y area of box 1 or 2 as implied to in the depiction at col. 67, lines 15-23. The Z memory, as applied in Dye characterizes the display memory for box 2 of the

second object. Thus, it can be used as the source operand for the locations of pixels by the second object (or the second graphics primitive).

As per 12, claim Dye, at fig. 32, discloses the step of comparing comprising calculating a first bounding box which surrounds the set of destination pixels location of the first graphics primitive (*as met by step 800*); calculating a second bounding box for each of the at least one set of source pixel locations of the second graphics primitive *(as met by step 800, see col. 67, lines 6-8, see also col. 66, lines 43-45);* and determining whether there is dependency if the first and ... overlap (*as met by step 802 of fig. 32, see col. 67, lines 8-23)).*

Claim 13 is rejected for the same reason as claim 10.

Claim 28 recites features equivalent to and performing the same function as claim 1, it is, therefore, rejected under the same reasons and rationale set forth for claim 1.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 14 is rejected under 35 U.S.C. 102(e) as being anticipated by Dye.

Considering claim 14, Dye, at figs. 26 (A-E) and 28-32, discloses an apparatus for determining dependencies (*e.g., collisions or unions*) between a first graphics primitive (i.*e., a first object*) and a second graphics primitive (*e.g., a second object*), see col. 66, lines 35-37, and lines 43-60)), method comprising a destination reservation station (e.g., windows workspace memory 30 or 50, see figs. 26[B or C]); for storing a destination bounding box location for the first graphics primitive (e.g., object or ID#); a source reservation station (e.g., display refresh list 10, see fig. 26A) for storing a source bounding box location for the first graphics primitive; and a first comparator (e.g., the representation of display memory, see fig. 28) for comparing the destination bounding box location for the first graphics primitive with a bounding box location of the second graphics primitive and generating a first resultant bit (e.g., a color bit or overlay bit, as depicted in figs 31 and 32). See col. 66, lines 32-66.

Allowable Subject Matter

5. Claims 18-27are allowed over the prior art.

6. Claims 4, 7, 15-17, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indicating Allowable Subject Matters

7. The present application has been thoroughly reviewed. Upon searching a variety of databases, the Examiner respectfully submits that the prior art of record (see PTO-

892 Form) fail to teach or suggest a method for parallel processing of a plurality of 3D primitives in an out of order sequence comprises processing at least two of the primitives in order at the same time, where that at least two of the primitives have no dependency and wherein a first primitive in the at least two is completely processed before the others; *detecting a dependency between a next primitive to be processed from the plurality in the queue and the primitives in the at least two which have not yet been completely processed; and skipping the next primitive to be processed from the plurality in the queue and processing a subsequent primitive from the plurality in the queue, wherein no dependency is detected between the subsequent primitive and the primitives in the at least two which have not yet been completely processed*, as recited in claims 18 [and 19 by dependency].

Claims 20-27 recite in part the underlying features of claims 19-20, and they are allowed over the prior art for at least the same reasons as claims 19-20.

Regarding claims 15-17, it is respectfully submitted that the Dye reference fails to teach a second and a third comparator for comparing the source bounding box location and the destination bounding box for the first graphics primitive with the destination bounding box location and the source bounding box location, respectively, of the second graphics primitive and generating a second and a third bit, respectively.

Claims 4, 7 and 28 are allowed because the prior art fail to teach "a write after read dependency is detected if the second bounding box overlaps the first bounding box" as recited in claim 4; and "a write after write dependency is detected if the second bounding box overlaps the first bounding box" as recited in claims 7 and 28.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesner Sajous whose telephone number is (703) 308-5857. The examiner can be reached on Mondays thru Thursdays and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Supervisor, Matthew Bella, can be reached at (703) 308-6829. The fax phone number for this group is (703) 308-6606.

Wesner Sajous -WS-

9/10/03

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